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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,451	12/27/2001	Akira Furuya	011758	1605

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 04/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
10/026,451

Applicant(s)  
Akira et al.

Examiner  
B. William Baumeister

Art Unit  
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Feb 21, 2003
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above, claim(s) 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Dec 27, 2001 is/are a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some\* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 3, 4 6) ☐ Other:

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## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election without traverse of invention I in Paper No. 6 is acknowledged.

### ***Drawings***

2. Figures 1-4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Almogy et al. '590 (previously made of record in IDS #4). See the embodiment of FIG 3 wherein a photodetector 300 is formed above a substrate having a slanted, flat, cleaved side surface for

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absorbing radiation. The detector is formed in a range in which a perpendicular line to said flat side face crosses.

5. Claims 1 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by JP '823 (previously made of record in IDS #3). See e.g., FIG 4c wherein the photodetector comprises an n-InP layer 302; undoped photoabsorption layer 303; n-InP cap layer 304; p diffused region 310 extending into the cap layer and the photoabsorption layer and ohmic electrodes 309/310. The InP substrate is diced all the way through at any desired angle [0018], such as 45 degrees.

6. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Spaeth et al. '223 (previously made of record in IDS #4). See e.g., Fig 1 wherein a photodetector is formed on the surface of a substrate having a slanted surface 5. The reference also states that anti-reflection coatings may be employed on the slanted side surfaces (col. 2, lines 55-59).

7. Claims 1, 2, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Ng, Complete Guide to Semiconductor Devices. Ng discloses GaAs-based QWIPs wherein the detector is formed on a GaAs substrate that has a 45 degree polished facet (cleavage plane) for receiving incident light and coupling the light to the MQW photoabsorption layer. See e.g., FIG 56.1(a).

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*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng as applied to the claims above. As explained above, Ng teaches of all of the limitations of independent claim 1, but does not further disclose what specific surface orientation may be employed for the GaAs substrate.

a. It was well known to those of ordinary skill in the art at the time of the invention that the (100) surface is the most commonly employed orientation for growing device layers on GaAs substrates, so it would have been obvious to have employed the (100) orientation for this reason, as set forth in claim 6.

b. In further regard to claim 4, as Ng teaches that the polished facet sideface of the substrate is angled 45 degrees to the principle surface, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the side face on the {110} or {111} planes because these are both natural cleavage planes for GaAs that are angled 45 degrees from the {100} plane.

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10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '823 as applied to the claims above. The embodiment of FIG 4(c) depicts the substrate being diced at an angle to the principle substrate, but that embodiment does not depict that the opposite sidewall is parallel. The embodiment of FIG 3 depicts the substrate being diced obliquely partially through the surface so that the opposite sidewall is parallel, but is not diced entirely therethrough.

a. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the teachings of the two JP '823 embodiments so as to form the opposing sidewall parallel to the light-receiving sidewall for achieving the simultaneous advantages of (1) simplifying the manufacturing process by enabling a plurality of devices to be separated from a single wafer by a single dicing operation; and (2) increasing the wafer's device yield by eliminating the waste of that portion of the substrate that is removed by the v-shaped dicing of the FIG 4(c) embodiment. This would be particularly advantageous for use in those applications wherein an additional reflective coating is placed on the opposing side-wall for preventing light scattering losses as taught by various references of record (e.g., Spaeth et al. '223, FIG 4).

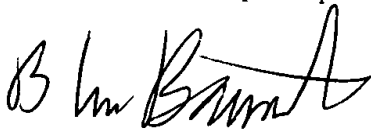
11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '823 as applied to the claims above and further in view of Makiuchi '114. JP '823 discloses that the angle may be freely chosen, but does not set forth what specific range of angles are desirable or achievable. Makiuchi teaches photodetectors wherein the substrate is provided with a sloped side wall region

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for the purpose of redirecting light entering the substrate towards the photodetector formed thereon. See e.g., Fig 6 wherein the specification discloses that angle theta 2 may range between 45 and 60 degrees. 60 degrees corresponds to the complementary angle as set forth in claim 5 of 30 degrees. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the sloped sidewall of JP '823 so as to have an angle specifically of 30 degrees as taught by Makiuchi depending only upon conventional considerations such as the specific light-detection application desired, which in turn, dictates the size of the detector/substrate combination and the spacial disposition of the detector thereon relative to the edge of the substrate surface.

#### INFORMATION ON HOW TO CONTACT THE USPTO

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



B. William Baumeister

Patent Examiner, Art Unit 2815

April 24, 2003